Using Predictive Modeling to Improve Child Welfare Decision Making in Allegheny County, PA

April 11, 2017
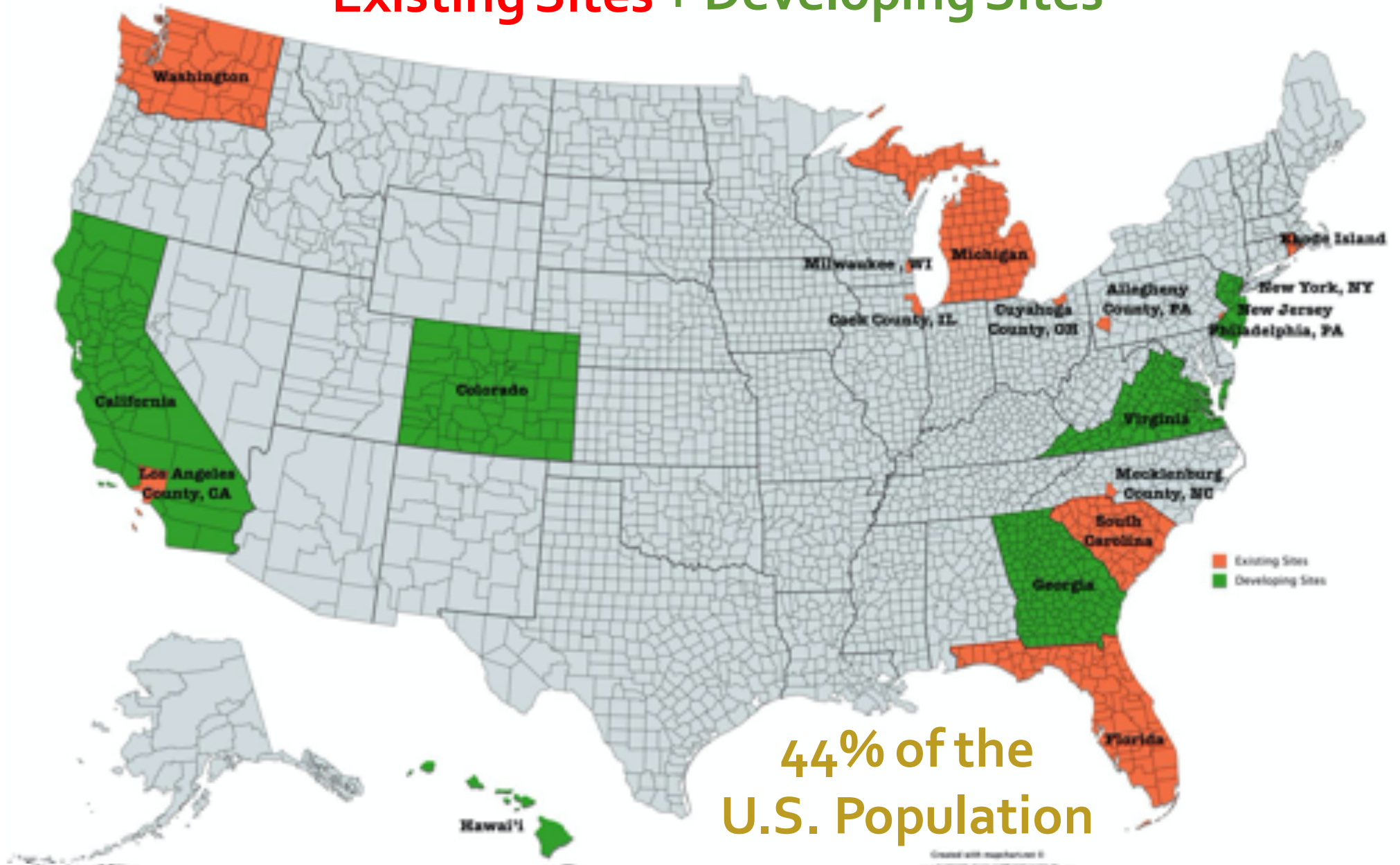Optimizing Government Workshop Presentation

ACTIONABLE INTELLIGENCE
FOR SOCIAL POLICY

What is an IDS?

AISP Network of Integrated Data Systems

Existing Sites + Developing Sites

Washington

California

Los Angeles County, CA

Colorado

Milwaukee, WI

Michigan

Cook County, IL

Cuyahoga County, OH

Allegheny County, PA

Rhode Island

New York, NY

New Jersey

Philadelphia, PA

Virginia

Mecklenburg County, NC

South Carolina

Georgia

Florida

Alaska

Hawai'i

Existing Sites
Developing Sites

44% of the U.S. Population

Using Predictive Modeling to Improve Child Welfare Decision Making

An Overview of the Development, Testing, and Implementation of the Allegheny Family Screening Tool

The Problem: Ineffective Screening

- 4 in 5 children in Allegheny County who died (or nearly died) as a result of abuse were <u>reported</u> but <u>not screened in</u> for investigation.

The Proposed Solution: Risk Scoring

- Use predictive modeling to generate risk scores

- Call center would use risk score to inform investigation decision

Using Predictive Analytics to Prevent Child Abuse

- Issued an RFP

- 16 organizations responded

- Many multidisciplinary teams

- Awarded—Auckland University

  - Experience

  - Concern with ethical issues

  - Implementation support

Key Partners

Research Team
- Rhema Vaithianathan, Auckland University of Technology
- Emily Putnam-Hornstein, USC
- Irene de Haan, University of Auckland
- Marianne Bitler, UC Irvine
- Tim Maloney, Auckland University of Technology
- Nan Jiang, Auckland University of Technology

Ethics
- Tim Dare, University of Auckland
- Eileen Gambrill, UC Berkeley

Evaluators
Process
Hornby-Zellar Associates
Impact
Stanford University

Technology Implementation
Deloitte

Allegheny County Dept of Human Services

What data go into the model?
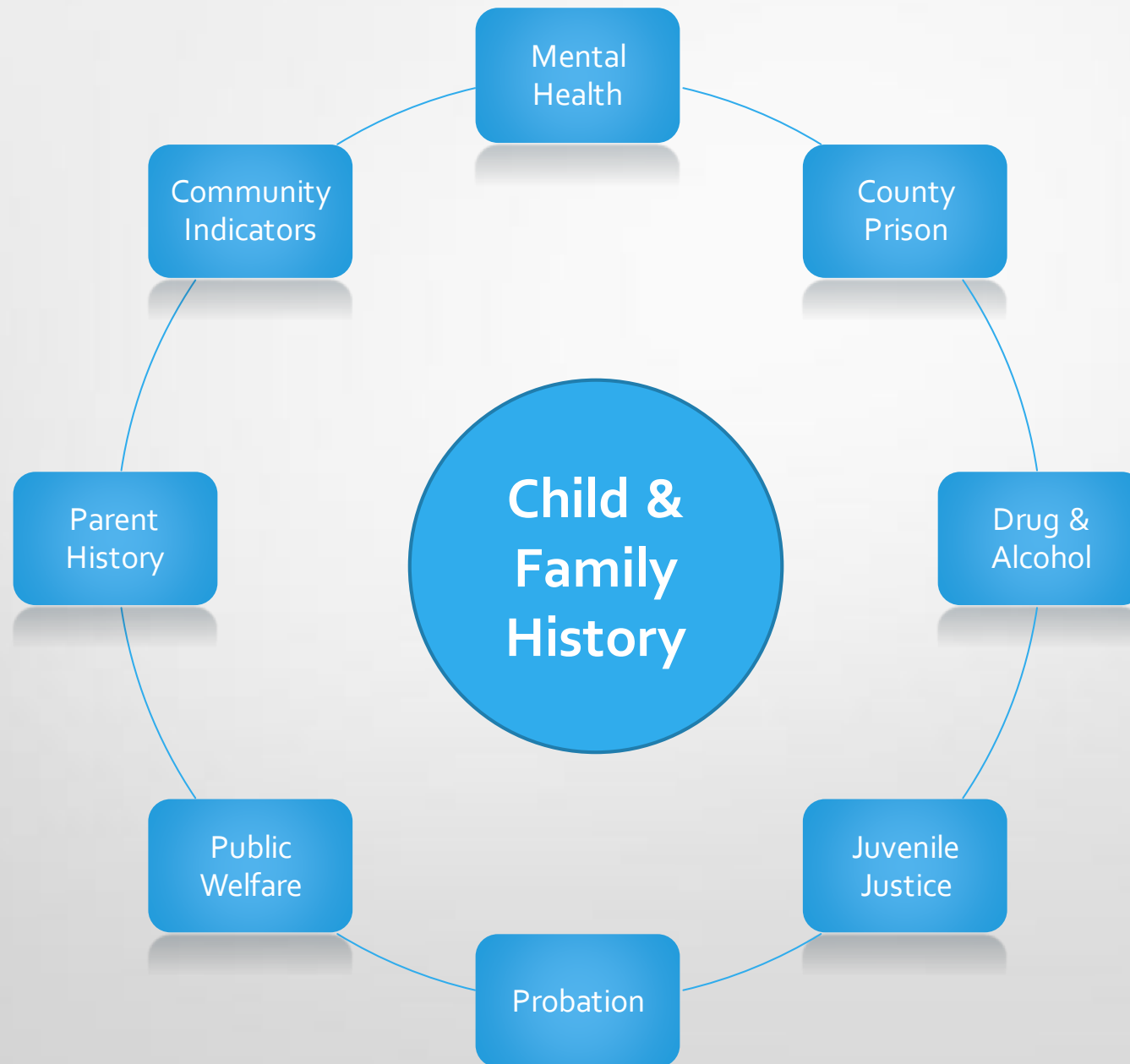
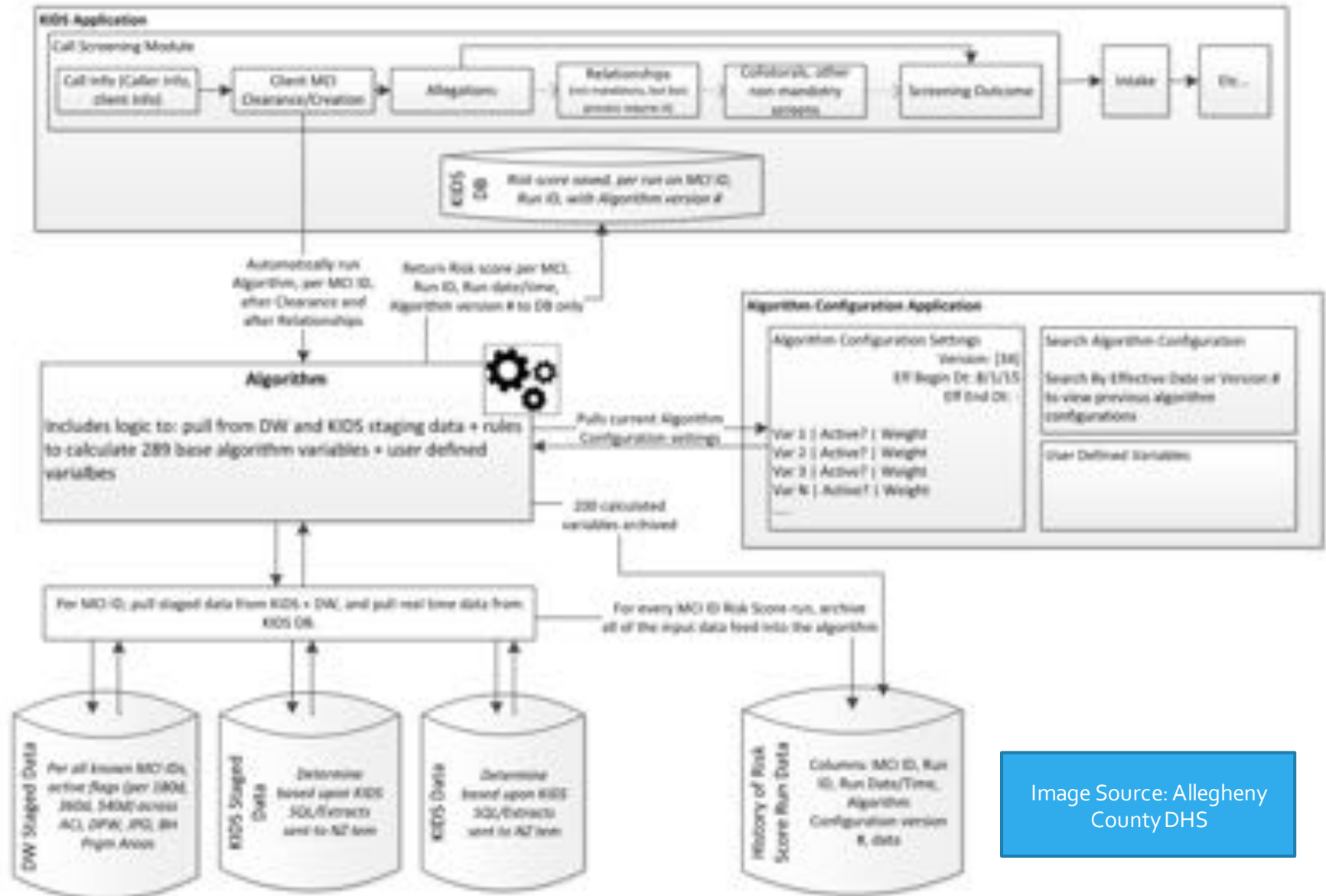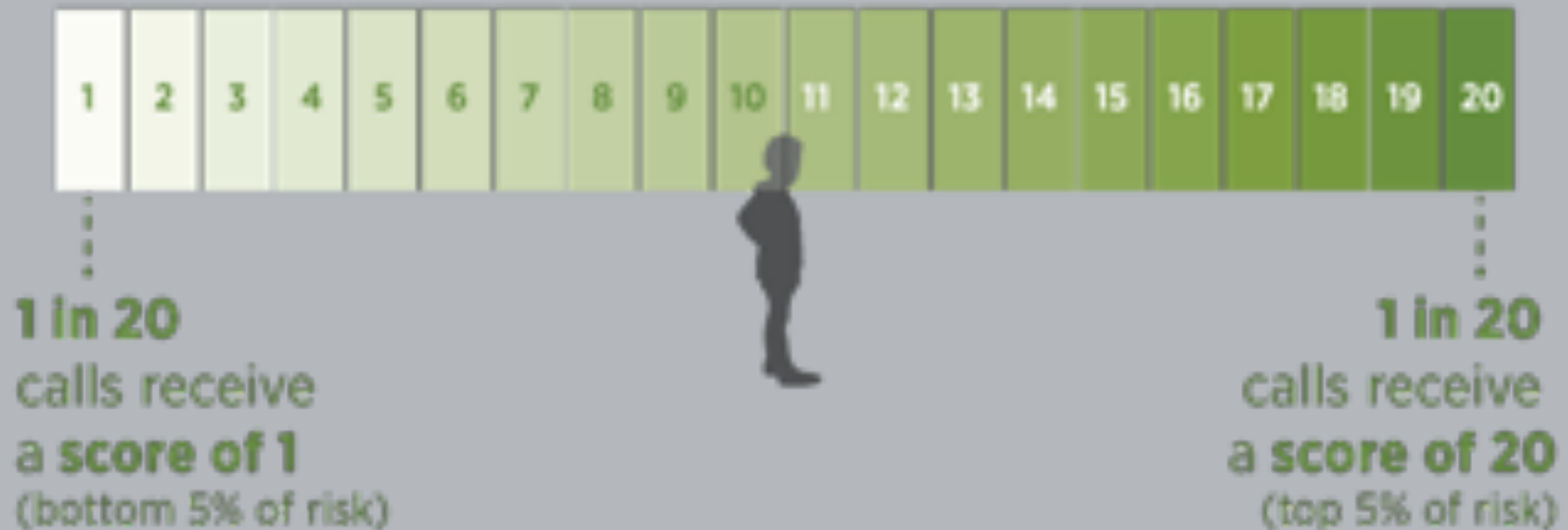# How the Score is Generated

Image Source: Allegheny County DHS

Developing a Screening Score

- The **screening score** is from 1 to 20

- The **higher the score, the higher the chance of the future event** (e.g., abuse, placement, re-referral) according to the data

1 in 20 calls receive a **score of 1** (bottom 5% of risk)

1 in 20 calls receive a **score of 20** (top 5% of risk)

Testing the Screening Model

- Tested model's accuracy using thousand of historical maltreatment calls

- Followed the children in subsequent referrals to see how often the model was correct...

Results: Predicting Re-referrals

Risk Score of 1

1 in 10 re-referred
within 2 years of a call

Risk Score of 20

9 in 10 re-referred
within 2 years of a call

Results: Predicting Out-of-Home Placement

- 1 in 100 children who received a score of 1 were placed in out-of-home care within 2 years of the call

- 1 in 2 children who received a risk score of 20 were placed in out-of-home care within 2 years of the call

<u>Without</u> the predictive model...

- 27% of the highest risk cases were screened out

- 48% of lowest risk cases were screened in

Model Validation —Preliminary Results

- Used Children's Hospital injury data

- Of all children referred to child welfare between 2010-2016, 21% had a hospital admission between 2002-2015

  - 5% of those kids had a Children's Hospital code for external injury

- Risk score of 20: 45% of those kids had a hospitalization & 16% had an external injury code

- Risk score of 1: 9% are hospitalized, 2% had an external injury code

Addressing Ethical Issues

- Multiple community meetings

- Independent ethical review

- Scores **never** generated based only on demographic information. Child and parent must have positive MCI ID.

Operationalizing Results

- Calls are now assessed using the risk score and information gathered from the caller

- All cases that score a **16 or higher** are **automatically referred** to investigation. Otherwise, the score is supplemental information.

Final Thoughts & Next Steps

- Existence of the IDS and 20+ years of successful IDS use made this an easier implementation in Allegheny County.

- Multiple jurisdictions are planning to replicate.

- Allegheny County now working on using predictive modeling to address other child welfare issues.

- Will soon release methodology paper & ethical analysis results.

Attribution Statement

- The Allegheny Family Screening Tool is a predictive risk modelling tool designed to improve child welfare call screening decisions. The Allegheny County Department of Human Services worked with an international research team to develop and implement the tool. The research team is led by Professor Rhema Vaithianathan from Auckland University of Technology, New Zealand and includes Associate Professor Emily Putnam-Hornstein from the University of Southern California.

- For detailed information about the project, find it on www.alleghenycountyanalytics.us